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To: Yoji Kondo

From: Ted Snow

Subject: Final report, grants NSG5-300 and NAG-5812

The two subject grants were awarded as a continuation of my longstanding research program to analyze *IUE* data (NSG5-300 was renewed continuously from 1979 or so until 1994, and has supported a wide variety of research; NAG5-5812 came about when for reasons unclear to me it was decided that follow-on work had to be supported under new grants. Hence I am combining my reports on both grants into one memo).

The general purpose of my *IUE* research has fallen into two areas: studies of stellar winds from hot stars, and analyses of interstellar abundances and extinction curves. Most of the work was in the latter area. In particular, during the final phase of my funded *IUE* work (and continuing to the present time under other funding sources) my emphasis was on interstellar depletions and their relationship to the nature of the dust as indicated by the extinction curve.

The major work that has resulted has been a study of how depletions may depend on the type of extinction curve that chararcterizes a line of sight. One paper has just been submitted to the *Astrophysical Journal* (and is also being presented as a poster at the AAS meeting next week), and another is in preparation. The first paper is a study of depletions in the vicinity of the Orion nebula, based on *IUE* measurements of interstellar absorption lines, and supplemented with velocity-structure information derived from optical high-resolution spectroscopy. We find that the depletions are somewhat lower for this type of sightline, characterized by low far-UV extinction and low molecular abundances, than for clouds having steeper UV extinction and higher molecular abundances. This implies that the dust grains have grown large in regions like Orion through coagulation rather than grain mantle growth. The paper in preparation will present an analysis of depletion data for lines of sight having steep far-UV extinction and high molecular abundances, where we believe that some mantle growth has occurred and we expect therefore that the depletions are greater.

Both studies are being conducted in collaboration with graduate student R. Young Shuping, who will incorporate this work into his doctoral dissertation. Shuping has been awarded a NASA Graduate Student Research Program grant, which will help defray the

cost of publishing the studies since the funds under grants NSG5-300 and NAG5-5812 are now depleted.